Appendix

Claims as pending upon entry of the attached Amendment

11. (amended) A thin film semiconductor device comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated on said semiconductor thin film through said gate insulating thin film,

wherein said semiconductor thin film is formed by forming a 30to 80 nm layer 0f amorphous silicon or polycrystalline silicon having a [relatively small] first particle diameter on a substrate, and irradiating said substrate with an energy beam to convert said semiconductor thin film to polycrystalline silicon having a [relatively] larger particle diameter than said first particle diameter,

a thin film transistor is integrated and formed in a prescribed region by using said semiconductor thin film thus converted to polycrystalline silicon as an active layer, and

a cross sectional shape of said energy beam is adjusted with respect to said region to irradiate said region at a time by a single shot irradiation, so that characteristics of said thin film transistor is made uniform.

12. (amended) A display device comprising a pair of substrates adhered to each other with a prescribed gap, and an

electrooptical substance maintained in said gap, one of said substrates comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor driving said pixel electrode, and said thin film transistor comprises a semiconductor thin film and a gate electrode accumulated on one surface of said semiconductor thin film through a gate insulating film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a [relatively small] first particle diameter on said other substrate, and irradiating said other substrate with an energy beam to convert said semiconductor thin film to polycrystalline silicon having a [relatively large] particle diameter that is larger than said first particle diameter,

a thin film transistor is integrated and formed in a prescribed region by using said semiconductor thin film thus converted to polycrystalline silicon as an active layer, and

a cross sectional shape of said energy beam is adjusted with respect to said region to irradiate said region at a time by a single shot irradiation, so that characteristics of said thin film transistor is made uniform.

17. (amended) A thin film semiconductor device comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated on

said semiconductor thin film through said gate insulating thin film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a [relatively small] first particle diameter on a substrate, on which plural units are formed, and intermittently irradiating said substrate, so as to convert to polycrystalline silicon having a [relatively large] particle diameter that is larger than said first diameter,

a cross sectional shape of said energy beam is adjusted with respect to said unit to irradiate one or two or more units at a time by a single shot irradiation, and

a thin film transistor is integrated and formed in said units thus subjected to irradiation at a time.

18. (amended) A display deice comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrate comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor driving said pixel electrode, and said thin film transistor comprises a semiconductor thin film and a gate electrode accumulated on one surface of said semiconductor thin film through a gate insulating film,

wherein said semiconductor thin film is formed by forming

a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a [relatively small] first particle diameter on a substrate, on which plural units are formed, and intermittently irradiating said substrate, so as to convert said semiconductor thin film to polycrystalline silicon having a [relatively] larger particle diameter than said first diameter,

a cross sectional shape of said energy beam is adjusted with respect to said unit to irradiate one or two or more units at a time by a single shot irradiation, and

a thin film transistor is integrated and formed in said units thus subjected to irradiation at a time.

27. (amended) A thin film transistor having a laminated structure comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated on said semiconductor thin film through said gate insulating thin film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a [relatively small] first particle diameter on a substrate, and irradiating a prescribed region of said substrate with laser light having a prescribed cross sectional shape to convert said semiconductor thin film to polycrystalline silicon having a [relatively] larger particle

diameter than said first diameter [at a time], and

said semiconductor thin film[s are] is accumulated by alternately repeating said film forming step and said irradiation step without exposing said substrate to the air.

28. (amended) A display device comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrate comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor driving said pixel electrode, and said thin film transistor comprises a semiconductor thin film and a gate electrode accumulated on one surface of said semiconductor thin film through a gate insulating film,

wherein said semiconductor thin film is formed by forming a layer of about 20 nm amorphous silicon or polycrystalline silicon having a [relatively small] first particle diameter on a substrate, and irradiating a prescribed region of said substrate with laser light having a prescribed cross sectional shape to convert to polycrystalline silicon having a [relatively] larger particle diameter than said first diameter [at a time], and

said semiconductor thin film[s are] is accumulated by alternately repeating said film forming step, where each additional formed film is about 1 nm, and said irradiation

step without exposing said substrate to the air.

39. (amended) A thin film transistor having a laminated structure comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated on said semiconductor thin film through said gate insulating film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of non-single crystal silicon on a substrate, and irradiating a prescribed region of said substrate one or more with a pulse of laser light having a constant cross sectional area and an emission time width from upstand to downfall of 50 ns or more, so as to convert said non-single crystal silicon contained in an irradiated area corresponding to said cross sectional area to a polycrystalline silicon at a time, and

[said polycrystalline silicon is modified by applying] a desired change to said energy intensity of said laser light from upstand to downfall of said pulse is applied to said polycrystalline silicon.

40. (amended) A display device comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrate comprises a counter electrode, the other substrate

comprises a pixel electrode and a thin film transistor driving said pixel electrode, and said thin film transistor comprises a semiconductor thin film and a gate electrode accumulated on one surface of said semiconductor thin film through a gate insulating film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of non-single crystal silicon on said other substrate, and irradiating a prescribed region of said substrate once or more with a pulse of laser light having a constant cross sectional area and an emission time width from upstand to down fall of 50 ns or more, so as to convert said non-single crystal silicon contained in an irradiated area corresponding to said cross sectional area to a polycrystalline silicon at a time, and

[said polycrystalline silicon is modified by applying] a desired change to said energy intensity of said laser light from upstand to downfall of said pulse is applied to said polycrystalline silicon.

53. (amended) A thin film transistor having a laminated structure comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated on said semiconductor thin film through said gate insulating film,

wherein said semiconductor thin film is formed by forming

a 30 to 80 nm layer of non-single crystal silicon on a substrate, and irradiating a prescribed region of said substrate once or more with a pulse of laser light having a constant cross sectional area and an emission time width of 50 ns or more with maintaining said substrate in a non-oxidative atmosphere, so as to convert said non-single crystal silicon contained in an irradiated area corresponding to said cross sectional area to a polycrystalline silicon at a time.

54. (amended) A display device comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrate comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor driving said pixel electrode, and said thin film transistor comprises a semiconductor thin film and a gate electrode accumulated on one surface of said semiconductor thin film through a gate insulating film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of non-single crystal silicon on said other substrate, and irradiating a prescribed region of said substrate once or more with a pulse of laser light having a constant cross sectional area and an emission time width of 50 ns or more with maintaining convert said non-single crystal silicon contained in an irradiated area corresponding to said

cross sectional area to a polycrystalline silicon at a time.

63. (amended) A thin film transistor having a laminated structure comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated on said semiconductor thin film through said gate insulating film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of non-single crystal silicon on a substrate, and irradiating a prescribed region of said substrate once or more with a pulse of laser light having a constant cross sectional area and an emission time width of 50 ns or more under conditions in that said substrate is uniformly heated, so as to convert said non-single crystal silicon contained in an irradiated area corresponding to said cross sectional area to polycrystalline silicon at a time.

65. (amended) A display device comprising a pair of substrate adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrate comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor comprises a semiconductor thin film and a gate electrode accumulated on one surface of said semiconductor thin film through a gate insulating film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of non-single crystal silicon on said other substrate, and irradiating a prescribed region of said substrate once or more with a pulse of laser light having a constant cross sectional area and an emission time width of 50 ns or more under conditions in that said other substrate is uniformly heated, so as to convert said non-single crystal silicon contained in an irradiated area corresponding to said cross sectional area to a polycrystalline silicon at a time.

73. (amended) A thin film transistor having a laminated structure comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated on said semiconductor thin film through said gate insulating film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of non-single crystal silicon on a substrate, and irradiating a prescribed region of said substrate once or more with a pulse of laser light having a constant cross sectional area and an emission time width of 50 ns or more under conditions in that said substrate is cooled to a temperature lower than room temperature, so as to convert said non-single crystal silicon contained in an irradiated area corresponding to said cross sectional area to a polycrystalline silicon at a time.

74. (amended) A display device comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrates comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor driving said pixel electrode, and said thin film transistor comprises a semiconductor thin film and a gate electrode accumulated on one surface of said semiconductor thin film through a gate insulating film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of non-single crystal silicon on said other substrate, and irradiating a prescribed region of said substrate once or more with a pulse of laser light having a constant cross sectional area and an emission time width of 50 ns or more under conditions in that said other substrate is cooled to a temperature lower than room temperature, so as to convert said non-single crystal silicon contained in an irradiated area corresponding to said cross sectional area to a polycrystalline silicon at a time.

Appendix
Amendments to the Claims

11. (amended) A thin film semiconductor device comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated [on] entirely within a prescribed region of said semiconductor thin film through said gate insulating thin film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a first particle diameter on a substrate, and irradiating said substrate with an energy beam to convert said semiconductor thin film to polycrystalline silicon having a larger particle diameter than said first particle diameter,

a thin film transistor is integrated and formed in [a] said prescribed region by using said semiconductor thin film thus converted to polycrystalline silicon as an active layer, and

a cross sectional shape of said energy beam is adjusted with respect to said region to irradiate said region in its entirety at a time by a single shot irradiation, so that characteristics of said thin film transistor [is] are made uniform.

12. (amended) A display device comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said

substrates comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor driving said pixel electrode, and said thin film transistor comprises a semiconductor thin film and a gate electrode accumulated [on] entirely within a prescribed region of one surface of said semiconductor thin film through a gate insulating film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a first particle diameter on said other substrate, and irradiating said other substrate with an energy beam to convert said semiconductor thin film to polycrystalline silicon having a particle diameter that is larger than said first particle diameter,

a thin film transistor is integrated and formed in [a] said prescribed region by using said semiconductor thin film thus converted to polycrystalline silicon as an active layer, and

a cross sectional shape of said energy beam is adjusted with respect to said region to irradiate said region in its entirety at a time by a single shot irradiation, so that characteristics of said thin film transistor [is] are made uniform.

17. (amended) A thin film semiconductor device comprising a semiconductor thin film, a gate insulating film accumulated

on one surface thereof, and a gate electrode accumulated [on] entirely within a unit of said semiconductor thin film through said gate insulating thin film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a first particle diameter on a substrate, on which plural units are formed, and intermittently irradiating said substrate, so as to convert to polycrystalline silicon having a particle diameter that is larger than said first diameter,

a cross sectional shape of said energy beam is adjusted with respect to said unit to irradiate an entirety of one or two or more units at a time by a single shot irradiation, and

a thin film transistor is integrated and formed in said units thus subjected to irradiation at a time.

18. (amended) A display device comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrate comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor driving said pixel electrode, and said thin film transistor comprises a semiconductor thin film and a gate electrode accumulated [on] entirely within a unit of one surface of said semiconductor thin film through a gate insulating film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a first particle diameter on a substrate, on which plural units are formed, and intermittently irradiating said substrate, so as to convert said semiconductor thin film to polycrystalline silicon having a larger particle diameter than said first diameter,

a cross sectional shape of said energy beam is adjusted with respect to said unit to irradiate an entirety of one or two or more units at a time by a single shot irradiation, and

a thin film transistor is integrated and formed in said units thus subjected to irradiation at a time.

27. (amended) A thin film transistor having a laminated structure comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated [on] entirely within a prescribed region of said semiconductor thin film through said gate insulating thin film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a first particle diameter on a substrate, and irradiating [a] said prescribed region of said substrate in its entirety with laser light having a prescribed cross sectional shape to convert said semiconductor thin film to

pol crystalline silicon having a larger particle diameter than said first diameter, and

said semiconductor thin film is accumulated by alternately repeating said film forming step and said irradiation step without exposing said substrate to the air.

28. (amended) A display device comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrate comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor driving said pixel electrode, and said thin film transistor comprises a semiconductor thin film and a gate electrode accumulated [on] entirely within a prescribed region of one surface of said semiconductor thin film through a gate insulating film,

wherein said semiconductor thin film is formed by forming a layer of about 20 nm amorphous silicon or polycrystalline silicon having a first particle diameter on a substrate, and irradiating [a] said prescribed region of said substrate in its entirety with laser light having a prescribed cross sectional shape to convert to polycrystalline silicon having a larger particle diameter than said first diameter, and

said semiconductor thin film is accumulated by alternately repeating said film forming step, where each additional formed film is about 1 nm, and said irradiation

step without exposing said substrate to the air.

39. (amended) A thin film transistor having a laminated structure comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated [on] entirely within a prescribed region of said semiconductor thin film through said gate insulating film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of non-single crystal silicon on a substrate, and irradiating [a] said prescribed region of said substrate in its entirety once or more with a pulse of laser light having a constant cross sectional area and an emission time width from upstand to downfall of 50 ns or more, so as to convert said non-single crystal silicon contained in an irradiated area corresponding to said cross sectional area to a polycrystalline silicon at a time, and

a desired change to said energy intensity of said laser light from upstand to downfall of said pulse is applied to said polycrystalline silicon.

40. (amended) A display device comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrate comprises a counter electrode, the other substrate

comprises a pixel electrode and a thin film transistor driving said pixel electrode, and said thin film transistor comprises a semiconductor thin film and a gate electrode accumulated [on] entirely within a prescribed region of one surface of said semiconductor thin film through a gate insulating film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of non-single crystal silicon on said other substrate, and irradiating [a] said prescribed region of said substrate in its entirety once or more with a pulse of laser light having a constant cross sectional area and an emission time width from upstand to down fall of 50 ns or more, so as to convert said non-single crystal silicon contained in an irradiated area corresponding to said cross sectional area to a polycrystalline silicon at a time, and

a desired change to said energy intensity of said laser light from upstand to downfall of said pulse is applied to said polycrystalline silicon.

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a 30 to 80 nm layer of non-single crystal silicon on a substrate, and irradiating [a] said prescribed region of said substrate in its entirety once or more with a pulse of laser light having a constant cross sectional area and an emission time width of 50 ns or more with maintaining said substrate in a non-oxidative atmosphere, so as to convert said non-single crystal silicon contained in an irradiated area corresponding to said cross sectional area to a polycrystalline silicon at a time.

54. (amended) A display device comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrate comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor driving said pixel electrode, and said thin film transistor comprises a semiconductor thin film and a gate electrode accumulated [on] entirely within a prescribed region of one surface of said semiconductor thin film through a gate insulating film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of non-single crystal silicon on said other substrate, and irradiating [a] said prescribed region of said substrate in its entirety once or more with a pulse of laser light having a constant cross sectional area and an emission time width of 50 ns or more with maintaining convert

said non-single crystal silicon contained in an irradiated area corresponding to said cross sectional area to a polycrystalline silicon at a time.

63. (amended) A thin film transistor having a laminated structure comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated [on] entirely within a prescribed region of said semiconductor thin film through said gate insulating film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of non-single crystal silicon on a substrate, and irradiating [a] said prescribed region of said substrate in its entirety once or more with a pulse of laser light having a constant cross sectional area and an emission time width of 50 ns or more under conditions in that said substrate is uniformly heated, so as to convert said non-single crystal silicon contained in an irradiated area corresponding to said cross sectional area to polycrystalline silicon at a time.

65. (amended) A display device comprising a pair of substrate adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrate comprises a counter electrode, the other substrate

comprises a pixel electrode and a thin film transistor comprises a semiconductor thin film and a gate electrode accumulated [on] entirely within a prescribed region of one surface of said semiconductor thin film through a gate insulating film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of non-single crystal silicon on said other substrate, and irradiating [a] said prescribed region of said substrate in its entirety once or more with a pulse of laser light having a constant cross sectional area and an emission time width of 50 ns or more under conditions in that said other substrate is uniformly heated, so as to convert said non-single crystal silicon contained in an irradiated area corresponding to said cross sectional area to a polycrystalline silicon at a time.

73. (amended) A thin film transistor having a laminated structure comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated [on] entirely within a prescribed region of said semiconductor thin film through said gate insulating film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of non-single crystal silicon on a substrate, and irradiating [a] said prescribed region of said

substrate in its entirety once or more with a pulse of laser light having a constant cross sectional area and an emission time width of 50 ns or more under conditions in that said substrate is cooled to a temperature lower than room temperature, so as to convert said non-single crystal silicon contained in an irradiated area corresponding to said cross sectional area to a polycrystalline silicon at a time.

74. (amended) A display device comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrates comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor driving said pixel electrode, and said thin film transistor comprises a semiconductor thin film and a gate electrode accumulated [on] entirely within a prescribed region of one surface of said semiconductor thin film through a gate insulating film,

wherein said semiconductor thin film is formed by forming a 30 to 80 nm layer of non-single crystal silicon on said other substrate, and irradiating [a] said prescribed region of said substrate in its entirety once or more with a pulse of laser light having a constant cross sectional area and an emission time width of 50 ns or more under conditions in that said other substrate is cooled to a temperature lower than room temperature, so as to convert said non-single crystal

silicon contained in an irradiated area corresponding to said cross sectional area to a polycrystalline silicon at a time.